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Fraunhofer IWS

Plenary Talk

Laser Goes Hydrogen

The successful rollout of hydrogen technology requires innovations in materials, manufacturing processes and process chains. Besides requirements regarding process scaling and costs, ecological aspects are increasingly coming into focus. A main research topic at Fraunhofer IWS are high rate capable processes for the production of metallic bipolar plates. These are, next to the membrane electrode unit, one of the key components of fuel cells. They are used, for example, for cooling the stack, for applying an electrical contact and for media distribution. A key lever for cost effective fuel cells is the effective use of low cost materials and scalable mass production processes for bipolar plates. For this purpose, Fraunhofer IWS develops vacuum coating technology, bonding processes as well as laser welding and cutting processes towards a continuous roll-to-roll fabrication. It was shown that steel strips can be coated continuously with a few hundred nanometer thick layer (pre-coating) and reshaped thereafter. In the area of joining processes, laser gap welding is currently being developed as a method that should enable high cycle rates (> 1 Hz) in joining the metallic strips. In addition to various manufacturing processes, hyperspectral imaging (HSI), an optical measurement process, is being further developed which will enable quality control of, for example, coatings over the entire surface at best.

About the Speaker

Prof. Dr. Christoph Leyens is a full professor for Materials Technology and director at TU Dresden as well as the director of the Fraunhofer Institute for Material and Beam Technology IWS Dresden. His research has covered high temperature lightweight materials including titanium, surface engineering, laser processing and additive manufacturing.